

Remarks

As discussed in detail below, Applicant submits that the Office Action fails to provide support for the rejections in accordance with 37 C.F.R. § 1.104(a)(2) and 35 U.S.C. § 132 (requiring an examiner to state reasoning and provide information to aid the applicant in judging the propriety of continuing the prosecution).

The non-final Office Action dated November 17, 2005, indicated that claims 1-21 are allowed; the provisional election of group I, claims 1-25 and 32-33, must be affirmed; claims 32-33 are rejected under 35 U.S.C. 102(e) over Resasco *et al.* (U.S. Patent No. 6,333,016); claims 22-25 are rejected under 35 U.S.C. 103(a) over Hwang *et al.* (U.S. Patent Publication No. 2003/0181328); and claims 22-25 are rejected under 35 U.S.C. 103(a) over Kim (U.S. Patent Publication No. 2003/0161782) in view of Hwang *et al.*

Applicant appreciates the allowance of claims 1-21.

With respect to the restriction requirement, Applicant elects the claims of group I, claims 1-25 and 32-33, without traverse. Claims 26-31 have been canceled.

Applicant has amended claims 22, 24, 25 and 32 to remove the reference numerals from the claims. These amendments merely address informalities and are not directed to any reasons related to patentability.

Regarding the prior-art rejections, Applicant traverses each of the rejections because the assertion of inherency is illogical, unsupported, and Applicant has not received a copy of the relied-upon article by Serp *et al.* No explanation has been presented as to how the teachings of Serp *et al.* relate to the '016 teachings. The inherency assertion is a conclusory statement without any rationale presented as support. Without further explanation, the inherency assertion cannot be maintained.

Applicant respectfully traverses the Section 102(e) rejection of claims 32 and 33 because the Office Action fails to present a reference that corresponds to the claimed invention. Generally, the Office Action fails to include any citation to the relied upon '016 reference, or any discussion of how the '016 reference allegedly corresponds to the claimed invention. Specifically, the '016 reference does not teach any use of iron-containing nanoparticles (claim 32) or iron-containing salt (claim 33). While the '016 reference teaches the use of Group VIII metal particles as asserted by the Examiner, the reference specifically excludes the use of iron: "the metallic catalytic particle includes a Group VIII metal, excluding iron, and a Group VIb metal" (column 3, lines 6-8) and

claims 56, 65, and 74. Iron is absent from the '016 listing of Group VIII metals used in the bimetallic catalysts. *See* column 4, lines 54-65. Moreover, the background portion of the '016 reference distinguishes the use of iron as a catalyst. Column 1, line 63 – column 2, line 31. Without a presentation of correspondence to each of the claimed limitations, the Section 102(e) rejection cannot be maintained. Accordingly, with or without the inherency allegation, the rejection is improper, and Applicant requests that the rejection be withdrawn.

Applicant respectfully traverses the Section 103(a) rejection in view of the '328 reference because the Office Action fails to present a reference that corresponds to the claimed invention. Again, the Office Action fails to identify how the '328 reference allegedly corresponds to the claimed invention. Specifically, the '328 reference fails to teach immersing the substrate in an aqueous solution containing iron-containing material and a reducing agent. The Office Action acknowledges that the '328 reference does not teach immersing the substrate and instead suggests that it would be obvious to immerse the substrate to coat the substrate with metal catalyst particles. However, the '328 reference specifically teaches that coating the substrate by immersing it would be useless because, "The mixture of the supported metal catalyst and the polymeric adhesive is coated on the surface of the substrate by screen-printing" (paragraph 0039, beginning thirteen lines from the bottom of the paragraph). The '328 reference also teaches an alternative method where the metal catalyst mixture is poured on a quartz boat substrate (paragraph 0039, beginning eight lines from the bottom of the paragraph). Because it teaches away, the '328 reference does not teach the claimed limitations directed to immersing the substrate (as it already teaches how metal catalyst is to be applied to a substrate). Applicant also submits that the '328 reference does not teach "forming hydroxyl material on the substrate" (for which there is no basis to assert inherency) and traverses the assertion that hydroxyl molecules are inherent on silica for the reasons discussed above. With or without the inherency allegation, the Office Action fails to present correspondence to each of the claimed limitations; therefore the Section 103(a) rejection is improper, and Applicant requests that it be withdrawn.

The Office Action also fails to present any correspondence to the limitations of dependent claims 23 and 24. Applicant fails to recognize where, and no teaching has been asserted that, the '328 reference teaches heating the substrate and forming iron

oxide nanoparticles (claim 23) and using the iron oxide nanoparticles to grow carbon nanotubes (claim 24).

Moreover, the Office Action fails to present any evidence of motivation from the '328 reference that a skilled artisan would be motivated to modify the '328 teachings. The Office Action provides no citation to any teaching in the '328 reference that would suggest modifying how the '328 reference teaches applying metal catalyst to a substrate. As the '328 reference already teaches at least two manners of application, one skilled in the art would not contradict the '328 teachings by replacing the stated manners of application with an entirely different one. Without a presentation of evidence from the cited reference, the Section 103(a) rejection is improper.

Applicant also traverses the Section 103(a) rejection in view of the '782 reference for the reasons discussed above in connection with the '328 reference as the rejection relies upon the deficient '328 teachings.

Moreover, Applicant fails to see any relevance of the '782 reference to the claimed invention. The '782 reference makes no mention of a substrate, forming hydroxyl material, immersing a substrate in an aqueous solution, forming iron-containing nanoparticles on the substrate, heating the substrate, forming iron oxide nanoparticles, using the iron oxide nanoparticles to grow carbon nanotubes, or reacting a catalyst precursor material on a substrate. The Office Action fails to identify, and Applicant fails to recognize, how the deficient '782 teachings would be combined with the deficient '328 teachings to form an embodiment that would correspond to the claimed invention. Without a presentation of correspondence to each of the claimed limitations, the Section 103(a) rejection is improper, and Applicant requests that it be withdrawn.

In view of the above discussion, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. A favorable response is requested. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is encouraged to contact the undersigned at (651) 686-6633.

Respectfully submitted,

CRAWFORD MAUNU PLLC
1270 Northland Drive, Suite 390
St. Paul, MN 55120
651/686-6633

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By: 

Robert J. Crawford
Reg. No. 32,122